

Amendments to the CLAIMS

1. (Canceled).
2. (Currently Amended): A magnetic sensor comprising;

a magnetoresistance effect element comprising a spin valve film, the film comprising ~~that contains~~ a free layer, a spacer layer and a pinned layer whose magnetization direction is pinned, wherein said layers are successively laminated on a substantially square portion of a substrate of a chip, said magnetoresistance effect element having a resistance value that changes in accordance with a relative angle formed by the magnetization direction of the pinned layer and a magnetization direction of the free layer;

said magnetic sensor being formed in such a manner that a plurality of said magnetoresistance effect elements are provided on the substrate in a single plane on a single chip ~~having a generally square shape~~, said magnetoresistance effect elements are placed symmetrically with respect to perpendicular center lines of the portion ~~said generally square chip~~, and the pinned layers of at least two of said plurality of magnetoresistance effect elements have the pinned magnetization directions that cross each other.
3. (Currently Amended): The magnetic sensor according to claim 2, including wherein four of said plurality of magnetoresistance effect elements ~~constructing a X-axis or a Y-~~ comprise a single axis magnetic sensor by full bridge

connection of the four elements, said pinned magnetization directions of the pinned layers of the four elements being parallel to each other.

4. (Currently Amended): A magnetic sensor comprising eight magnetoresistance effect elements including a first through an ~~eight~~ eighth element, each of said elements ~~containing~~ comprising a spin valve film, the film comprising a free layer, a spacer layer and a pinned layer, said pinned layer having a pinned ~~whose magnetization direction, wherein each element has is pinned and each having~~ a resistance value that changes in accordance with a relative angle formed by a magnetization direction of said pinned layer and a magnetization direction of said free layer;

said magnetic sensor being formed in such a manner that said magnetoresistance effect elements are provided ~~in~~ a single plane on on a substantially square portion of a substrate on a single chip ~~having a generally square shape,~~ the portion having left, right, top and bottom sides, and perpendicular center lines on ~~having sides along~~ an X-axis and a Y-axis ~~that are perpendicular to each other in a plan view;~~

(a) said first element being formed in a ~~neighborhood of an end of the chip in a negative direction of the X-axis and a little~~ a lower left quadrant of the portion, below and near ~~a generally central part of the chip in the Y-~~

axis and near the left side~~direction~~, and having a pinned magnetization direction of said first element's pinned layer in a direction of the X-axis;

(b) said second element being formed in a ~~neighborhood of an end of the chip in a negative direction of the X-axis and a little~~an upper left quadrant of the portion, above and near~~a generally central part of the chip in the Y-axis and near the left side~~direction, and having a pinned magnetization direction of said second element's pinned layer in the direction of the X-axis;

(c) said third element being formed in a ~~neighborhood of an end of the chip in the positive direction of the X-axis and a little~~an upper right quadrant of the portion, above and near~~a generally central part of the chip in the Y-axis and near the right side~~direction, and having a pinned magnetization direction of said third element's pinned layer in the direction of the X-axis;

(d) said fourth element being formed in a ~~neighborhood of an end of the chip in the positive direction of the X-axis and a little~~a lower right quadrant of the portion, below and near~~a generally central part of the chip in the Y-axis and near the right side~~direction, and having a pinned magnetization direction of said fourth element's pinned layer in the direction of the X-axis;

(e) said fifth element being formed in a ~~neighborhood of an end of the chip in the positive direction of the Y-axis and a little to the~~ the upper left quadrant of the portion, to the left of and near a generally central part of the chip in the X-axis direction and near the top side, and having a pinned magnetization direction of said fifth element's pinned layer in the direction of the Y-axis;

(f) said sixth element being formed in a ~~neighborhood of an end of the chip in the positive direction of the Y-axis and a little to the~~ the upper right quadrant of the portion, to the right of a generally central part of the chip in and near the X-axis direction and near the top side, and having a pinned magnetization direction of said sixth element's pinned layer in the direction of the Y-axis;

(g) said seventh element being formed in a ~~neighborhood of an end of the chip in the negative direction of the Y-axis and a little to the~~ the lower right quadrant of the portion, to the right of a generally central part of the chip in and near the X-axis direction and near the bottom side, and having a pinned magnetization direction of said seventh element's pinned layer in the direction of the Y-axis; and

(h) said eighth element being formed in a ~~neighborhood of an end of the chip in the negative direction of the Y-axis and a little to the~~ the lower left quadrant of the portion, to the left of a generally central part of the chip

~~in~~and near the X-axis ~~direction~~and near the bottom side, and having a pinned magnetization direction of said eighth element's pinned layer in the direction of the Y-axis.

5. (Currently Amended): The magnetic sensor according to claim 4 wherein:

(a) said first to fourth elements construct an X-axis magnetic sensor for detecting a magnetic field in ~~the~~a X-axis direction by full bridge connection of the first to fourth elements; and

(b) said fifth to eighth elements construct a Y-axis magnetic sensor for detecting a magnetic field in ~~the~~a Y-axis direction by full bridge connection of the fifth to eighth elements.

6. (Currently Amended): The magnetic sensor according to claim 5, wherein:

(a) the pinned magnetization direction of the pinned layer of the first and the second elements are in ~~the~~a negative direction of the X-axis;

(b) the pinned magnetization direction of the pinned layer of the third and the fourth elements are in ~~the~~a positive direction of the X-axis;

(c) the pinned magnetization direction of the pinned layer of the fifth and the sixth elements are in ~~the~~ a positive direction of the Y-axis; and

(d) the pinned magnetization direction of the pinned layer of the seventh and the eighth elements are in ~~the~~ a negative direction of the Y-axis.

7. (Currently Amended): A magnetic sensor comprising a plurality of magnetoresistance effect elements, each element comprising a spin valve film, the film comprising a free layer, a spacer layer and a pinned layer having a pinned magnetization direction, said layers are successively laminated on a substrate of a chip, wherein the element has a resistance value that changes in accordance with a relative angle formed by a magnetization direction of the pinned layer and a magnetization direction of the free layer:

(a) said magnetic sensor ~~being is~~ is formed ~~in such a manner that said~~ from magnetoresistance effect elements that are laminated directly on a single substrate ~~are provided~~ on a single chip;

(b) an X-axis group of said magnetoresistance effect elements constructing a X-axis magnetic sensor for detecting a magnetic field in ~~the~~ an X-axis direction; and

(c) a Y-axis group of said magnetoresistance effect elements constructing a Y-axis magnetic sensor for detecting

a magnetic field in ~~the~~ a Y-axis direction perpendicular to the X-axis.

8. (Currently Amended): The magnetic sensor according to claim 7, wherein:

(a) said X-axis group of magnetoresistance effect elements construct the X-axis magnetic sensor by full bridge connection, and the pinned magnetization directions of ~~these~~ the X-axis group of magnetoresistance effect elements are in the X-axis direction; and

(b) said Y-axis group of magnetoresistance effect elements construct the Y-axis magnetic sensor by full bridge connection, and the pinned magnetization directions of the Y-axis group of magnetoresistance effect elements are in the Y-axis direction.